



# Forest Health

## VERMONT *highlights*

# 2019



## 2019 Vermont Forest Health Highlights

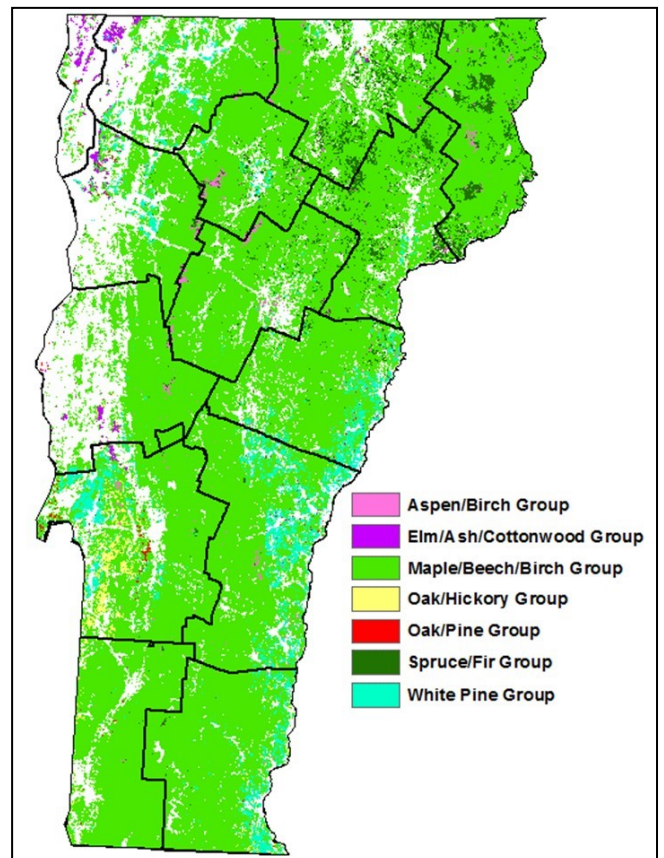
These Forest Health Highlights summarize information from the annual report on Forest Insect and Disease Conditions in Vermont. They provide an overview of the forest resource in Vermont, forest health program highlights, a weather summary, sections on hardwood and softwood insects and diseases which are native or established in the state, a section on exotic forest pests which are not known to occur in the state, a summary of activities related to non-native invasive plants, and forest health monitoring results.

Vermont forest health information is available online at <https://fpr.vermont.gov/forest/forest-health>, or you can [contact us](#):

- for assistance in identifying pests or diagnosing forest health problems
- to request on-site evaluations or management recommendations
- to obtain defoliation maps and hard-copy publications
- to participate in invasive pest citizen monitoring.

## Forest Resource Summary

Vermont's forests cover about three-quarters of the state and include billions of trees. Eighty percent of the State's forest land is privately owned with 11% under Federal management in the Green Mountain National Forest and 8% managed by the State of Vermont. Sugar and red maple and eastern hemlock are the most common species by number and volume. More information on Vermont's forest inventory can be found at <https://fpr.vermont.gov/forest-inventory-and-analysis-fia>.



*Distribution of forest type-groups in Vermont. Source: US Forest Service Forest Inventory and Analysis 2008 NLCD 2006 (Fry et al. 2011). Credit: R. Morin; data available at: <http://www.fia.fs.fed.us/tools-data/>*



*Healthy forests are ecologically functional and resilient to disturbance. They are valued by communities and have the capacity to produce economic benefits. The mission of the Vermont Division of Forests is to manage for and protect healthy forests. We work with Vermont citizens to promote forest health, supporting best management practices, sustainable use, and respect for the land.*

## Forest Health Program Highlights

The Vermont Department of Forests, Parks and Recreation (FPR) conducts aerial and ground surveys to detect forest damage. In addition, long-term monitoring plots are inspected to evaluate forest health. FPR and the Agency of Agriculture, Food and Markets (AAFM) collaborate with USDA agencies to survey and manage **non-native forest pests**, and with University of Vermont (UVM) Extension on education and outreach.

In 2019, 76,896 acres of forest damage were sketchmapped during statewide **aerial detection surveys**. This represents less than 2% of Vermont's forest land, and a decrease from the 128,872 acres mapped in 2018. Hardwood discoloration, due to maple leaf cutter and/or anthracnose, and white pine needle damage accounted for 37% and 31%, respectively, of the area mapped.

Vermont's **firewood quarantine**, the [Rule Governing the Importation of Untreated Firewood into the State of Vermont](#), went into effect in 2016. Untreated firewood, less than 48 inches in length, cannot be brought into Vermont unless a waiver has been granted to the person moving the firewood. Currently seventeen waivers are in effect for firewood from adjacent counties in New Hampshire, New York, or Massachusetts. Waivers for wood from counties known to have EAB do not allow the importation of untreated ash firewood.



The **Vermont Forest Pest Outreach Program**, implemented by UVM, reached 318 people at workshops, presentations and trainings and an estimated 400,000 people through exhibits, newsletters, radio, newspapers or social media. Efforts included:

- Posting a challenge on the Young Writers website to write about the impact of emerald ash borer (EAB) on Vermont's trees. The three winning pieces were presented at Vermont Arbor Day and made available through [Vermont Public Radio](#), [VtDigger](#), and local newspapers.
- Creating [interpretive signs](#) about EAB for museums and nature centers. The signs have visited the Vermont Institute of Natural Science, the Montshire Museum of Science, North Branch Nature Center, the Birds of Vermont Museum and the Southern Vermont Natural History Museum.
- Partnering with the Vermont Department of Libraries to distribute [an educational poster](#) about the signs and symptoms of EAB to over 180 libraries.
- Creating an "[Online EAB Awareness Toolkit](#)" with DIY activities for Forest Pest First Detectors and other concerned community members to educate homeowners and others about EAB.



*Volunteer Forest Pest First Detectors continued to conduct outreach at the Vermont Farm Show and other events.*

*Loren Young, 12-year old winner of the Young Writers Challenge, read his piece at the Vermont Arbor Day Conference.*

*EAB interpretive signs were displayed at several locations including the Montshire Museum.*

*Photos: G. Nickerson*





*The Forest Biology Lab's insect collection has been restored and moved to the new VAEI in Randolph. Photo: T. Hanson*

The **Forest Biology Lab** was relocated to the new Vermont Agricultural and Environmental Laboratory (VAEL) on the campus of Vermont Technical College in Randolph. This new facility reunites multi-agency functions that were dispersed following Tropical Storm Irene in 2011. Concurrently, the restoration of the Forest Biology Lab insect collection reached new milestones. This collection contains at least 1,884 different species of Vermont invertebrates. By moving the collection to secure space at VAEI and updating the collection's database, the preserved specimens and their records can now be easily accessed.

The lab continues to provide invertebrate identifications, tree disease diagnoses and pest management recommendations, and supports education and outreach. In 2019, our inquiries came from all 14 Vermont counties, with highest numbers from Addison, Chittenden and Washington Counties. Three percent of our inquiries were from out-of-state.

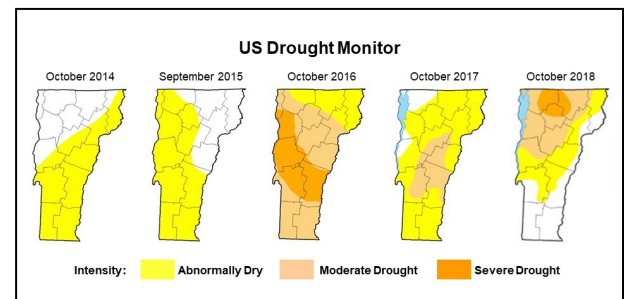
The **Forest Ecosystem Monitoring Cooperative** completed its 29th year of monitoring forest ecosystem health, originally as the Vermont Monitoring Cooperative. Tree condition was evaluated on 48 permanent plots, with crown ratings similar to the long-term average. Other results are available at the [FEMC website](http://femc.vermont.edu).

## 2019 Weather Influences on Forest Health

Winter of 2018-2019 was generally colder and snowier than normal, especially in northern Vermont. With winter snow-melt, and rainfall through the spring and early summer, Vermont was free of abnormal dryness and drought conditions that had been common in recent years. The periodically wet conditions did contribute to windthrow in saturated soils and led to foliage diseases that developed throughout the growing season. Cool conditions prolonged spring development.

Scattered summer storms resulted in tree damage, including late July straight line winds in northwestern Vermont and an August tornado in the town of Windham.

Dry conditions started to develop by mid-August. By the end of September most of the state was rated as abnormally dry and had experienced some frost. With the moderately dry conditions, sunny fall days, and just enough cold, trees with the capacity to turn red displayed brilliant fall colors.

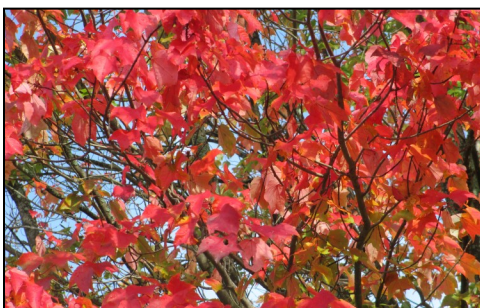


*Periodic dry conditions since 2014 continue to impact tree health. Map: NOAA/USDA/NDMC <http://droughtmonitor.unl.edu/>*



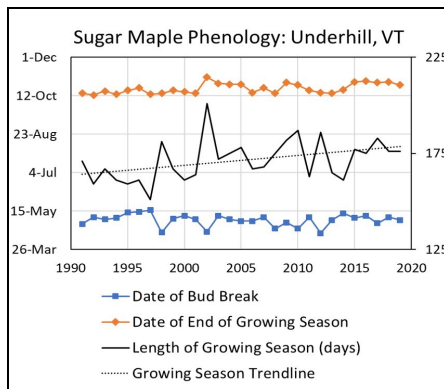
Although growing conditions in 2019 were generally good, trees did not "forget" the drought of 2016, the late-season dry conditions in 2017, and the prolonged period of warm, dry weather in 2018. This period of stressful growing conditions continued to be a major driver of tree health and ability to recover from other stressors.

This was a good year for spring flowering species. With an off-year for fruiting in 2018, trees were ready for a seed year, and prolonged cool weather helped flower retention. The result was a **heavy seed crop** on many species, including red, silver, and sugar maple, yellow birch, red oak, beech, hophornbeam and white cedar. White ash was notably absent from the list of 2019 heavy seed producers.



*Copious flower production and heavy seed were present on a variety of trees, including sugar maple. Photo: L. Lund*

*Moderately dry conditions and sunny days brought out the fall reds in red maple and other species. Photo: B. Schultz*



We continue to monitor **phenology** for the timing of budbreak, leaf out, fall color and leaf drop. Sugar maple bud expansion matched the long-term average in 2019, with budbreak occurring on May 3. Full leaf-out stalled, however, and occurred 6 days later than average. The timing of peak fall color was close to average for most species. Color development was initially slow. Partially due to multiple high-wind events, full leaf drop occurred rapidly following peak. Based on sugar maple phenology, the total growing season was five days longer than the long-term average.

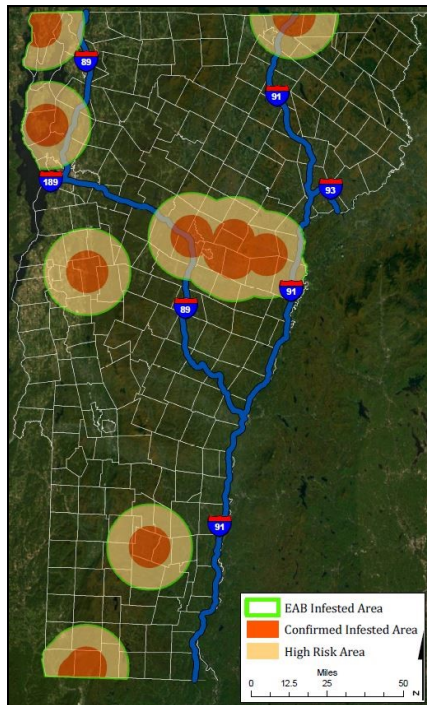
*Sugar maple phenology monitoring indicates that 2019 continued the trend of longer growing seasons.*

## Hardwood Insects and Diseases

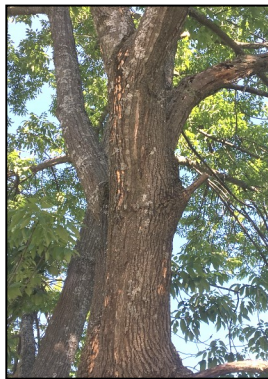
New detections of emerald ash borer (EAB) continued in 2019. As a result, EAB has now been confirmed in ten Vermont towns in eight counties. The sudden eruption of EAB detections in Vermont may be related to the recent dry growing seasons. Although EAB infests healthy ash trees, it is especially successful in stressed trees.

Suspects were reported in Bristol, Derby, and Londonderry by individuals with professional connections to plant health. Because each represented a new county for EAB, insect identification was confirmed by a USDA APHIS identifier. EAB beetles were collected from two different purple traps in Alburgh, making it the second confirmed town in Grand Isle County. These were among the 78 traps deployed by volunteers in 30 towns throughout the state. EAB was not collected from any of the other traps.

*The EAB detections in Alburgh were found by volunteers using purple prism traps, similar to this one maintained by Forest Pest First Detector Bob Little Tree in Hartford. Photo: G. Nickerson*



Maps indicating known EAB infested areas in Vermont are available at [vtinvasives.org](http://vtinvasives.org). The mapped areas indicate the likelihood of EAB based on where it has actually been observed; EAB is not necessarily present throughout. We know that by the time the insect is detected, it has already dispersed, so any ash within ten miles of a known EAB location is considered to be at-risk. Including these high-risk areas, the mapped Infested Area now includes all or part of 85 towns in thirteen counties. The infested areas are also available for download on the ANR Atlas <http://anrmaps.vermont.gov/websites/anra5/>.



Applying Slow the Spread Recommendations to the mapped Infested Area reduces the risk of spreading EAB and provides time to conduct management activities. While high risk areas include many towns, visibly infested trees still remain rare in Vermont and there's a lot of spread to slow. One change to these recommendations in 2019 was to redefine the EAB flight season as June 1<sup>st</sup> – September 30<sup>th</sup>. After looking at weather records from locations throughout the state, and considering growing degree day models, it was determined that EAB beetle emergence will not actually begin until June in Vermont.

*The mapped EAB Infested Area extends ten miles from known EAB locations. There is a high risk of spreading EAB when moving ash from these locations unless Slow the Spread Recommendations are followed.*

*EAB is difficult to find when it first infests a new location because it is under the bark and often high in the trees. Photo: J. Nunery*



Sign up for the [EAB Update Listserv](#) to receive notification of new detections, and please continue to look for signs and symptoms of the insect and report suspicious findings on [vtinvasives.org](#). The following resources are available to assist in slowing the spread of EAB and managing threatened resources.

### Recommendations to Slow the Spread of EAB:

[Moving Ash from the Infested Area](#): How and when it is safe to move ash forest products originating from the infested area.

[Ash Processing Options](#): Treatments and processing measures that make ash wood material safe to move at any time of year.

[For Forest Landowners](#): How landowners can avoid spreading EAB when conducting management activities.

[For Tree Care and Clearing](#): How to safely handle ash material resulting from tree care, land clearing, ROW maintenance, and similar activities.

[Transporting Ash Wood Products into Vermont Safely and Legally](#): How and when it is safe to move ash forest products originating from outside Vermont.

### Information for Homeowners and Municipalities

[Homeowner's Guide to Emerald Ash Borer](#): Information to help decide what to do about ash trees at risk.

[Options for Protecting Ash Trees from EAB with Insecticide Treatments](#): When to consider insecticide and guidelines for having trees treated.

[Community Planning](#): Goes to VT Urban & Community Forestry's EAB Management website.

### Information for Forest Landowners and Managers

[Emerald Ash Borer: Information for Forest Landowners](#)

[Ash Management Guidance for Forest Managers](#)

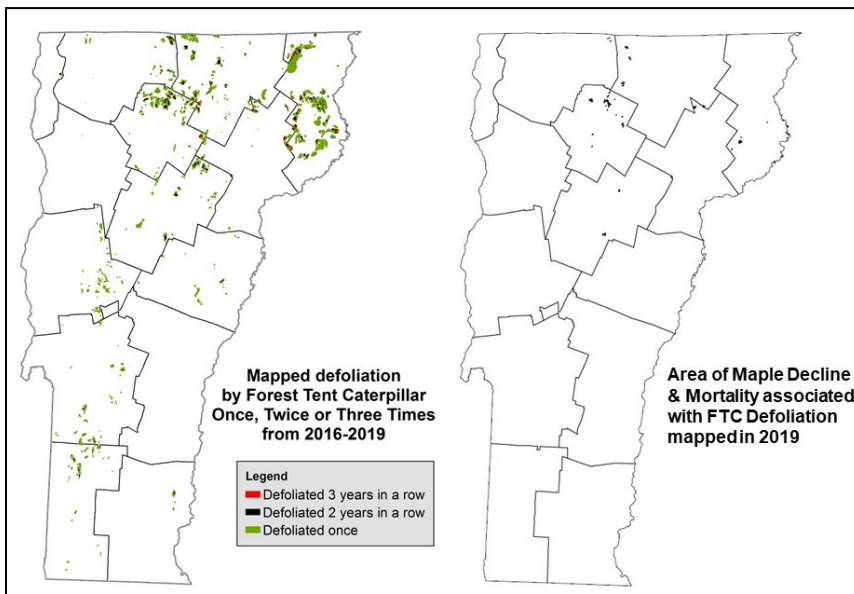
[UVA Policy on Forest Management Plans and Amendments](#)

[Trap Tree Protocol for Forest Landowners](#): How to implement the most effective technique for early detection of EAB on a property.

Recommendations to SLOW THE SPREAD of Emerald Ash Borer When Moving Ash from the Infested Area		
Emerald ash borer (EAB) infestations naturally spread one to two miles annually. However, without due care, movement of infested material, especially ash firewood and logs, results in a faster and wider spread of EAB to uninfested areas. Carefully planning and managing the movement of infested or potentially infested material will slow the spread and provide greater protection for uninfested forests.		
To slow the spread of EAB, follow these recommendations for the movement of forest products harvested within the Infested Area to other locations within the federal EAB quarantine boundary, which includes the rest of Vermont.		
SLOW THE SPREAD Recommendations		
Material to be Moved	Optimal Practices NON-FLIGHT SEASON October 1 – May 31	FLIGHT SEASON June 1 – September 30
Ash sawlogs	<ul style="list-style-type: none"><li>Notify purchaser of origin.</li><li>Purchaser utilizes prior to May 31 and treats* bark properly – see recommendations for bark below.</li></ul>	<ul style="list-style-type: none"><li>Delay harvest until October 1.</li><li>If harvesting must occur, notify purchaser of origin. Purchaser processes immediately and treats* infested bark properly – see recommendations for bark below.</li></ul>
Ash roundwood (splitwood, log, length firewood, bole wood)	<ul style="list-style-type: none"><li>Notify purchaser of the origin.</li><li>Move to a purchaser that will process or treat* by May 31.</li><li>Do not sell for use as homeowner firewood outside the infested area.</li></ul>	<ul style="list-style-type: none"><li>Delay harvest until October 1.</li><li>If harvesting must occur, delay movement until after October 1.</li><li>If movement is unavoidable before October 1, notify purchaser of origin. Purchaser processes and/or treats* immediately.</li><li>Do not sell as homeowner firewood or bole wood outside the infested area.</li></ul>
Whole tree chips	<ul style="list-style-type: none"><li>Notify purchaser of the origin.</li></ul>	<ul style="list-style-type: none"><li>Notify purchaser of the origin.</li></ul>
Bark treatments	<ul style="list-style-type: none"><li>Burn in boilers onsite.</li><li>Grind before May 31.</li></ul>	<ul style="list-style-type: none"><li>Burn in boilers onsite immediately.</li><li>Grind immediately.</li></ul>
Split ash firewood	<ul style="list-style-type: none"><li>Do not move ash firewood, that has not been heat treated*, outside the infested area.</li></ul>	<ul style="list-style-type: none"><li>Do not move ash firewood, that has not been heat treated*, outside the infested area.</li></ul>
Viciously infested trees (flaking bark, galleries)	<ul style="list-style-type: none"><li>Leave on site or treat as above.</li></ul>	<ul style="list-style-type: none"><li>Leave or treat on site.</li></ul>
<small>* See <a href="#">vtinvasives.org/and/emerald-ash-borer-vermont/slow-spread-of-ash-for-processing-options</a>. For additional information or questions, contact (802) 828-1511. VERMONT DEPARTMENT OF FORESTRY, FISH &amp; WILDLIFE, DIVISION OF FORESTAL HEALTH, PLANT &amp; ANIMALS, March 2019</small>		

*Recommendations for preventing unintended movement of EAB and information about ash management are available at <https://vtinvasives.org/land/emerald-ash-borer-vermont>.*

**Forest Tent Caterpillar (FTC)** defoliation plummeted, with only 537 acres of defoliation mapped in 2019, compared to 71,315 acres in 2018. In all, 156,718 acres were defoliated at least once since 2016. Defoliation data are available on the [ANR Natural Resources Atlas](#). In late 2018 and early 2019, egg mass surveys were conducted in 16 sugarbushes. Only one was identified as at risk of defoliation. No landowners chose to have their properties treated.

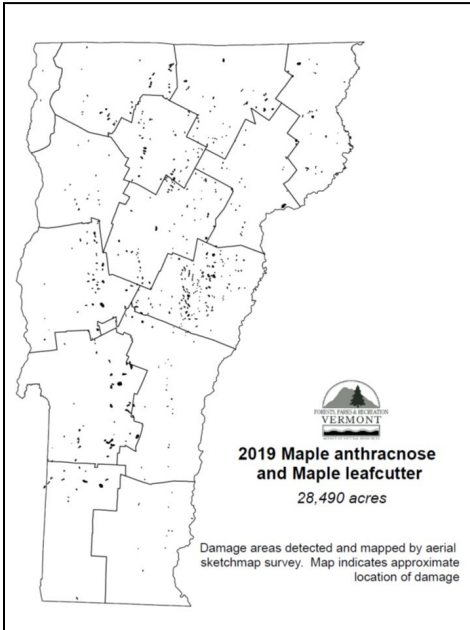
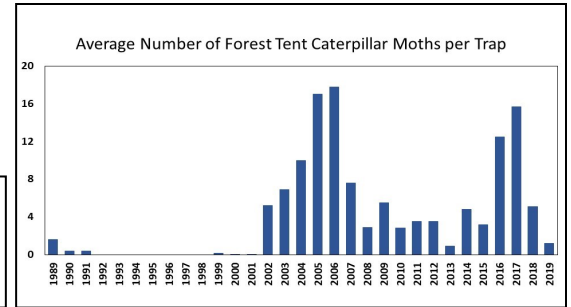


Despite the drop in acres defoliated, the impacts of this outbreak persist. In 2019, we mapped 3,438 acres with dieback or mortality attributed to FTC, in addition to the 4,500 acres mapped in 2018. This is likely the result of repeated years of defoliation, dry growing conditions, and minimal refoliation. Ground evaluations were conducted at four of these sites. More than 69% of sugar maples had at least 50% crown damage. Sugar maple mortality averaged 37%.

*Since 2016, 156,718 acres were defoliated at least once by forest tent caterpillar. Maple decline and mortality have been detected in some locations which had been defoliated.*

Pheromone traps for FTC were deployed statewide in mid-summer. The number of moths per trap averaged 1.2, a drop from 15.7 at the height of this outbreak. Coupled with the decrease in acres defoliated, this suggests that the outbreak has come to a close.

*The recent forest tent caterpillar outbreak appears to be over based on 2019 moth counts as well as on the drop in acres defoliated.*



*Hardwood foliage symptoms mapped late in the season were caused by a variety of factors, mostly affecting sugar maple. Photo: L. Lund*

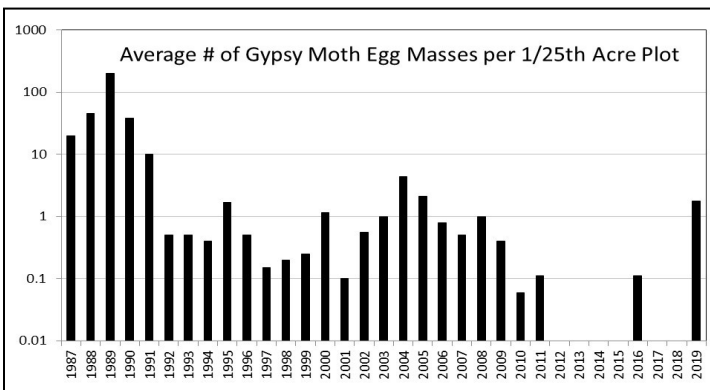
Thin hardwood crowns and foliage browning were mapped on 28,490 acres in mid-late summer, with a variety of factors responsible. **Ma-**  
**ple leaf cutter** populations were very high again this year and led to brown patches of sugar maple at mid-elevations. Maple leaf cutter feeding was also noticeable on yellow birch and beech. Some hardwood browning was due to **an-**  
**thrachnose** and other fungi that infected leaves emerging during wet periods in the spring. The **heavy**  
**seed** crop also contributed to the observed symptoms, resulting in unusually small upper-crown leaves which dropped prematurely.

*Top: Maple leaf cutter damage led to brown hillsides at mid-elevations. Photos: J. Halman, E. Meacham*

*Bottom: Anthracnose and heavy seed also contributed to hardwood browning. Photos: J. Esden, B. Schultz*



While there were only a few reports of **gypsy moth** caterpillar feeding, egg masses were much more noticeable than normal and counts increased in monitoring plots. While populations are collapsing in southern New England, it's possible they will increase next year in Vermont.



*Gypsy moth populations may be increasing, based on egg masses sightings and counts in monitoring plots. Photo: A. Wild*



Several other hardwood defoliators also attracted attention. **Fall webworm** defoliation was locally very heavy on cherries and ash along road edges and open areas. The unique feeding pattern of **oak shothole leafminer** was observed throughout the range of red oaks.

*By early summer, red oak injury by oak shothole leafminer was widely observed. Later in the season, fall webworm nests were more conspicuous than usual. Photos: R. Skinner, R. Kelley*



Light feeding by **saddled prominent** caterpillars was reported mostly in southern Vermont. Our outbreaks have a history of following forest tent caterpillar outbreaks, so it would not be a surprise if this insect is on the rise. Outbreaks often develop suddenly and disappear just as quickly.



*To determine if saddled prominent is of concern in 2020, look for caterpillars starting in July. Photo: R. Kelley*

*Early leaf drop of white ash is attributed to late season dry conditions. Photo: B. Schultz*

We received multiple reports of **thin black cherry crowns** during the summer. Intact leaf drop had been observed by early July. The cause is unknown. Late-summer **leaf drop of white ash** was even more widespread. Dry conditions that began in August are a likely explanation.

**Beech bark disease** symptoms were mapped on 15,073 acres. Casual observations indicate that beech scale is more prevalent, possibly due to recent winters without prolonged cold snaps. Dry late summer and fall weather also benefited scale survival and dry bark is more susceptible to canker fungi.

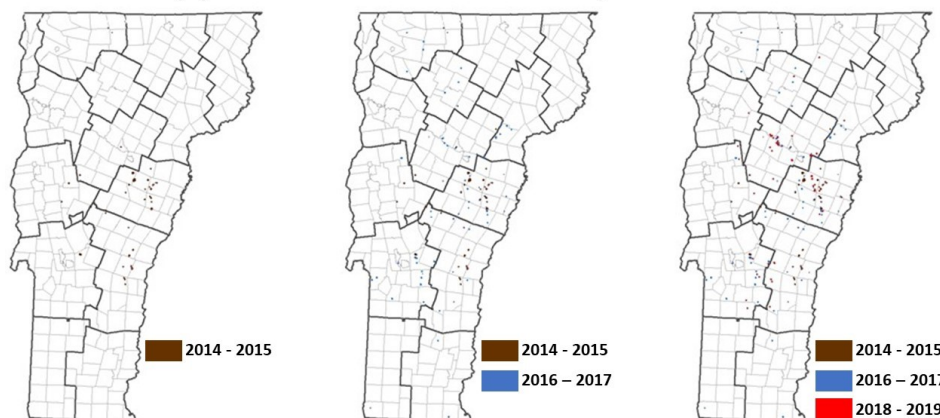


## Softwood Insects and Diseases

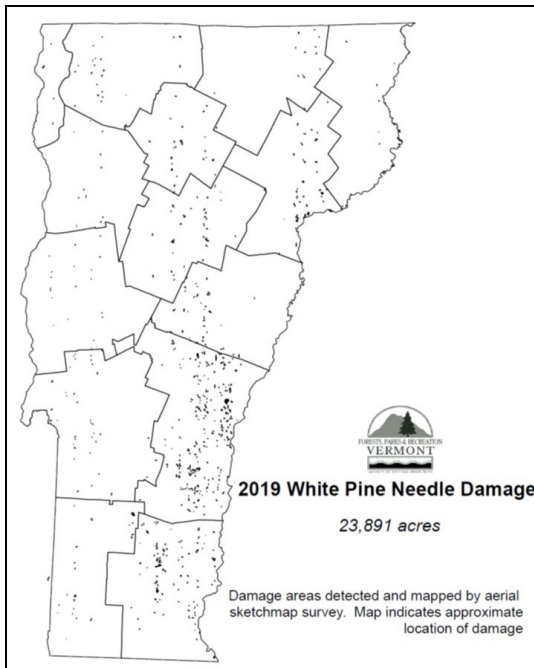
Reports of **red pine mortality** continued in 2019, with 556 acres mapped, scattered in seven counties. While the expanding pattern of the mortality is consistent with a non-native organism, the cause remains unknown. Repeated examinations of symptomatic branches have only found widely established insects and diseases, such as Diplodia and Sirococcus shoot blights and pine gall weevil damage. The exotic insect, red pine scale, has not been detected in Vermont since 2015, when it was only found in two locations. We are beginning to establish monitoring plots to track crown changes in affected stands.

*Dry late-summer and fall weather favors beech scale crawler survival. Photo: R. Kelley*

### Mapped Red Pine Mortality 2014 - 2019

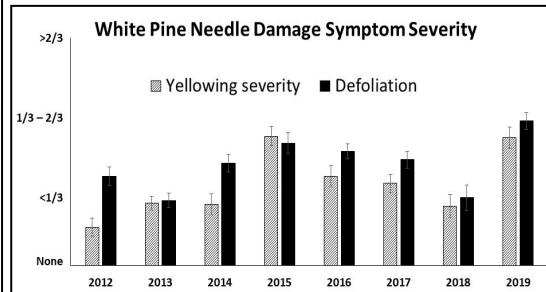


*The cause of red pine mortality remains unknown, although the expanding pattern is consistent with a non-native organism. Photo: B. Schultz*

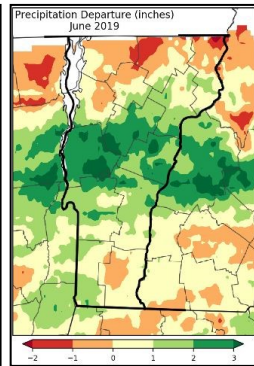


**White pine needle damage (WPND)** was widespread with 23,891 acres mapped during aerial surveys. WPND has been a regional problem since 2010, attributed to a complex of fungal pathogens.

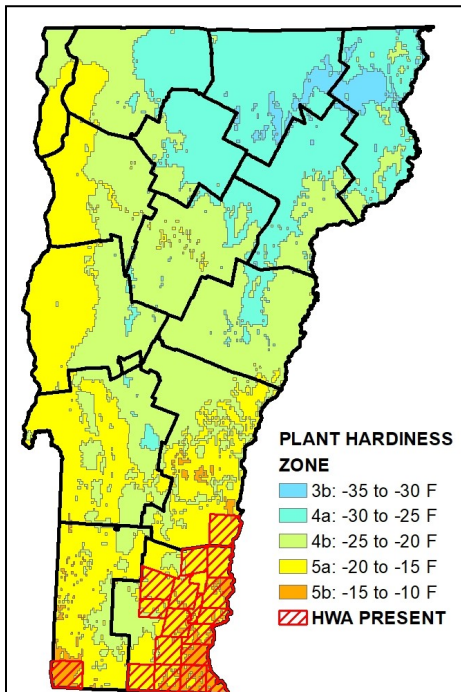
In 2019, symptoms were not noticeable until mid-June, which is later than other years. Regionally, WPND severity in monitoring plots was higher than in any year since 2012; Vermont data follow this trend. Needle damage generally affects the same trees each year, and some are now exceedingly thin. Decline and mortality of white pine have been observed in stands which have had multiple years of WPND and where other stress factors are present.



WPND severity is linked to the amount of humidity when spores were produced the previous year. This is between May and August, generally peaking during shoot elongation in June. As a result of this year's weather, we expect WPND again in 2020.

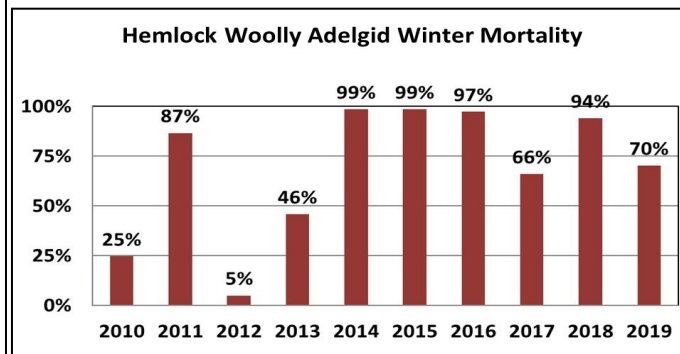


*White pine needle damage was mapped on 23,891 acres. Symptoms in Vermont plots were the most severe since monitoring began in 2012. In these plots, some trees are consistently more symptomatic every year than other trees. Because infection peaks during shoot elongation in June, which was wetter than normal this year, we expect WPND to continue in 2020. Photo: B. Schultz. Precipitation map: NE Regional Climate Center*



Vermont's **hemlock woolly adelgid (HWA)** infestation remains primarily in Windham County, with small spots in Springfield and Pownal. Traditionally infested sites are still infested, but no spread was documented in 2019. Insect populations were sparse all year despite a lower winter 2018-19 mortality rate of only 70%. The impact of several heat waves through the summer may be part of the explanation.

The leaflet [Hemlock Woolly Adelgid in Vermont: Recommendations for Landowner Response](#) was updated due to changes in Vermont's neonicotinoid pesticide rules and our developing understanding of the insect.



To augment biocontrol efforts that began in 2009, 510 *Laricobius nigrinus* predatory beetles were released in November at a site in Brattleboro. Beetles have also been re-released in Guilford and Pownal.

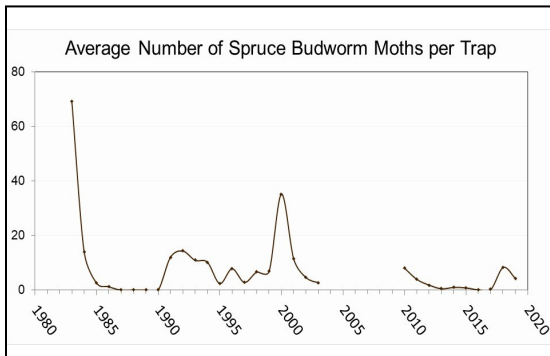
*Vermont's HWA infestation remains centered in Windham County, with no expansion to new towns detected in 2019. This was in spite of a lower HWA mortality rate in winter 2018-19, which dropped to 70%.*





Compounding the risk to hemlock, the incidence of **elongate hemlock scale** seems to be on the rise in southern Windham County due to natural spread. In addition, it has been occasionally been found on nursery-grown trees over the past 20 years. In 2019, an infested balsam fir planting in Charlotte was treated in an effort towards eradicating that introduction.

*Elongate hemlock scale is increasingly noticeable in Windham County. It has been occasionally found elsewhere on planted fir and other hosts. Photo: B. Guenther*



We're continuing to see fir mortality due to **balsam woolly adelgid** (BWA) in natural stands and ornamental trees, although the mapped acreage is declining. Mild winters have allowed this insect to build up. Signs of BWA are often absent by the time tree mortality occurs.

While **spruce budworm** continues to cause widespread defoliation in eastern Canada, the number of moths captured in Vermont pheromone traps this summer remained low.

*Spruce budworm moth trap catches remain low.*

## Exotic Forest Pests Threatening Vermont



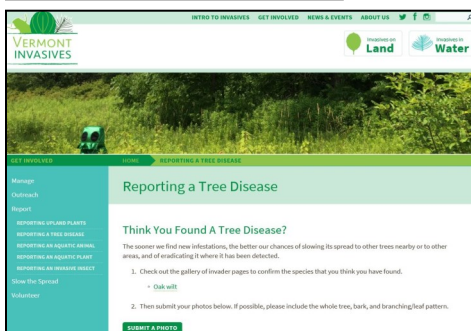
The **common pine shoot beetle** has been found in many Vermont counties since it was detected in the state in 1999. By federal quarantine, pine material is free to move within Vermont and through most of the region. The USDA has recently proposed lifting this quarantine. See [Pine Shoot Beetle Quarantine Considerations](#) for more information.

We do not currently suspect **oak wilt** anywhere in Vermont. However, Vermont is participating in a regional oak wilt survey because new locations are being detected in New York state. If you have seen a tree with symptoms that match oak wilt, please visit [vtinvasive.org](#)'s [Report it](#) so we can follow up on your observation. For more information: <https://www.vtinvasives.org/invasive/oak-wilt>.

**Beech leaf disease** is also of increasing concern with recent detections in Connecticut and southeastern New York. For more information on identifying the disease, see this [Forest Health Pest Alert](#).

**Asian longhorned beetle** is not known to occur in Vermont, however education and outreach that can promote early detection remains a priority. In 2019, the insect was declared eradicated from New York City.

Other **non-native insects and diseases that have not been observed in Vermont** include winter moth, spotted lanternfly, and the agents that cause thousand cankers disease.



*Vermont is participating in a multi-state effort to detect oak wilt, which has been confirmed in multiple locations in New York. Symptoms are sudden. The entire crown is affected within weeks or months, and red oaks will be dead by the following spring. Please report suspect trees through [vtinvasives.org](#). Photo: B. Schultz*



*Middle school student-volunteers learned how to use a weed wrench from FPR staff in Richmond. Since 2018, 1,110 students from more than 20 schools have participated in a hands-on program to learn about non-native invasive plants. Photo: E. Spinney*

## Non-Native Invasive Plant Programs

**Non-native invasive plant (NNIP)** management efforts continued in 2019, with progress on control, outreach and education made possible through several grant funded opportunities. FPR's Invasive Plant Coordinator and Habitat Restoration Crew led 47 workshops and the Coordinator fielded over 300 inquiries about invasive plants. Since 2014, 3,810 volunteers have assisted with direct management of NNIP in Vermont.

A program for middle and high school groups continued this year. Since 2018, 1,110 students from over 20 different schools learned about invasive plant identification and ecosystem impacts and participated in a hands-on experience removing them.

The Forest Hero! Network was established in late 2018 to provide training and support for local leaders working to motivate citizens in their communities to engage in non-native invasive plant management. The network is a collaboration between Vermont Coverts, FPR and VTinvasives.org. Thirty people completed the training, with four sessions conducted between October 2018 and October 2019.

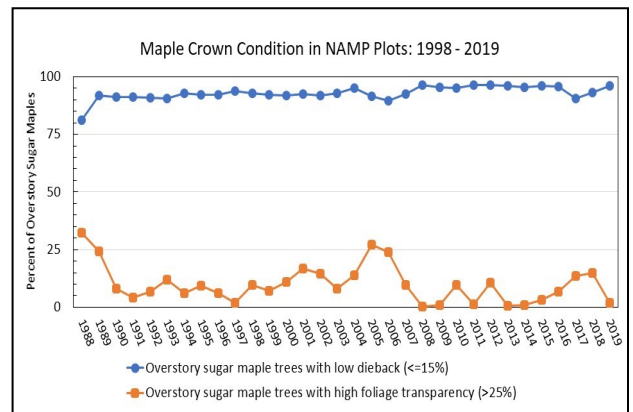
*Forest Hero! Network volunteers learn about how to teach plant identification. Photo: L. Thornton*



## Monitoring Forest Health

Vermont has continued to monitor sugar maple health in sugarbushes and forest stands since 1988. In these **North American Maple Project (NAMP)** plots, 96% of overstory sugar maples were rated as healthy (less than 15% dieback), which is slightly higher than in 2018 (93%). There was a decrease in trees with thin foliage (2%) attributed to the end of the forest tent caterpillar outbreak and more available water during the growing season. The decrease in dieback coupled with less transparent foliage suggests improved sugar maple health statewide.

**UrbanFIA** work continued for the fourth year in Vermont. This US Forest Service program parallels traditional Forest Inventory and Analysis (FIA), measuring changes to forest demography and health through a network of long-term plots. Vermont was the first state to commit to a full Urban-FIA program, targeting urban areas statewide rather than focusing on a single metropolitan area. In 2019, all plots were completed by the end of June through the combined efforts of the US Forest Service, FPR, and the Forest Ecosystem Monitoring Cooperative. Data are collected on a seven year cycle, after which a statewide report will be published.



*Sugar maple crown condition improved in maple health monitoring plots. Trees are recovering from successive dry years and forest tent caterpillar defoliation.*



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